

CERTAINTY EFFECTS ON PERCEIVED BIAS
AND DOWNSTREAM EFFECTS ON PERSUASION

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KEITH RICHARDS

ANDREW LUTTRELL – ADVISOR

BALL STATE UNIVERSITY

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Abstract

Claims of bias in other people are common, but when do we perceive bias in others? Some research has looked at the links between bias and trustworthiness, perceived ulterior motives, and close-mindedness. This thesis looks at the influence of a source's certainty on the bias that audiences perceive. Before reading a fictional political campaign message about a race for local county commissioner, participants were presented with a statement with one of three levels of certainty about the message. In these statements, the communicator indicated either high certainty or uncertainty. In the third control condition, no indication of certainty was made about their position. Source certainty was not found to influence perceived bias in the scenario studied; however, source certainty did influence perceptions of the source's credibility. Perceived credibility mediated the effects of source certainty on perceptions of argument quality.

Certainty Effects on Perceived Bias and Downstream Effects on Persuasion

Claims of bias in other people are common. This can be especially true between disagreeing parties. For instance, political candidates call out opponents for biased argumentation or biased voting records. News media pick up on these perceived biases and report on them with their own perceptive slant. Audiences of news media no doubt perceive varying degrees of bias in the reporting. The media bias that audiences perceive based on their prior beliefs is often called the hostile media effect (Vallone, Ross, & Lepper, 1985). It is easy to see how readily people can perceive bias in others, especially when their views are not aligned. This is true even when there is no actual bias present.

When do we perceive others as biased? One factor may be the certainty with which someone states their position. A communicator's statement of certainty may insinuate that their attitude is the correct one above all others, and that it will be resistant to persuasion. Thus, certainty in a political position may seem especially close-minded and biased. Political opponents, news media, and news audiences may easily interpret certainty as bias, and this perception could influence attitudes, persuasion, and perhaps future behavior such as voting.

In the context of persuasion, a communicator's certainty and perceived bias are understudied areas. The present research intends to examine the effects of a source's certainty on perceptions of bias, and what implications those perceptions have on an audience's persuasion toward a message. When a source expresses certainty or uncertainty in their opinion, does this affect how biased the source seems and subsequently affect their ability to be persuasive? There has been little research so far on the links between a source's expressed certainty, perceived bias, and persuasion, with a few notable exceptions (e.g., Wallace, Wegener, & Petty, 2019b), so much work is left in pulling apart certainty and bias and how they influence persuasion.

Attitudes and Persuasion

Attitudes have been a highly studied area of research, with numerous definitions of what an attitude is. Generally, attitudes are conceptualized as a tendency to act or react in a favorable or unfavorable way toward an attitude object (Ajzen & Fishbein, 1977; Fazio, Powell, & Herr, 1983). In simpler terms, attitudes are the beliefs and preferences people hold. For example, someone who opposes nuclear power has a negative attitude toward that energy source. Someone who likes Starbucks has a positive attitude toward that coffee chain. Attitudes are important because they are valuable in predicting behavior (Fishbein & Ajzen, 1980; Glasman & Albarracín, 2006; Wallace, Paulson, Lord, & Bond, 2005). In the case of consumer attitudes, someone with a more positive attitude toward Starbucks will be more likely to buy their morning coffee there. Moreover, the stronger an attitude, the more influential and predictive it is of behavior (Krosnick & Petty, 1995). An attitude can be strengthened in various ways, such as reading or self-generating strong arguments in favor of it (Petty & Cacioppo, 1986) and labeling the attitude as moral (Luttrell, Petty, Briñol, & Wagner, 2016), which can also increase the attitude's resistance to persuasion.

Given the attitude-behavior relationship, attitudes are often the primary target of persuasive messages. Crano and Prislin (2006) review the literature of persuasion from 1994 to 2004, distinguishing between attitude formation and attitude change. Attitude formation is the initial development of an attitude toward an object or position, with or without the presence of a persuasive message intended to influence that attitude. Attitude change is the difference between an initial attitude and a new attitude after a persuasive message has been introduced. Attitude change has been used as the measure of persuasion in numerous studies (e.g., Dahm, Samonte, &

Shows, 2009; Petty & Cacioppo, 1986; Price & Stone, 2004). If people can persuade someone else to change an attitude, they can likely influence their behavior.

Persuasion can be shaped by many different variables, including the quality of arguments presented, the characteristics of the message source, and the characteristics of the audience receiving the message (Petty & Briñol, 2008). Each of these can vary in their effectiveness to persuade based on the context (for reviews of models of attitude change, see Petty & Cacioppo, 1986, and Chaiken, Liberman, & Eagly, 1989, for the elaboration likelihood model and heuristic-systematic model, respectively).

Most important to this paper are characteristics of the message source or communicator. Characteristics of communicators, such as credibility and attractiveness, can give them persuasive advantages (Petty & Cacioppo, 1986). Expertise, knowledge, and trustworthiness are often considered aspects of source credibility, or how much importance a communicator's stance on a topic should hold. For example, an environmental scientist would be a very credible source if he or she is discussing climate change, but less credible if he or she is discussing something unrelated like criminal litigation. Highly credible sources are generally more persuasive than less credible sources (Hovland & Weiss, 1951; Sternthal, Dholakia, & Leavitt, 1978).

In addition to the person delivering the message, audiences are also sensitive to the content of the message itself. Specifically, strong message arguments are more persuasive than weak message arguments, especially when the audience is motivated and able to elaborate on the message (Petty & Cacioppo, 1986). However, strong arguments may not always be available. In this case, there are other routes to persuasion that do not necessitate a strong argument. Communicators can craft their arguments to be more persuasive by aligning messages with an audience's values and self-schema (Cacioppo, Petty, & Sidera, 1982; Wheeler, Petty, & Bizer,

2005), emotions (Edwards, 1990; Petty & Briñol, 2015), or even their cultural identity (Han & Shavitt, 1994).

Although source credibility and argument strength have received extensive scholarly attention, two potentially relevant persuasion variables are still not well understood: source certainty and source bias. The relationship between certainty and bias, and their impacts on persuasion, still need to be examined.

Source Bias

Bias is defined as any prejudice in favor of or against one thing, person, or group compared with another, usually considered to be unfair. Source bias in this paper refers to how much a communicator seems inclined to unfairly favor a particular position on the issue. Source bias could be due to prejudice, political leanings, or ulterior motives. Perceptions of source bias would likely cause less persuasion in the audience because the communicator's arguments may in turn be seen as weak and unfair, or their credibility may be reduced due to the bias. Evidence thus far is limited, but prior research suggests that people are sensitive to the possibility that others' opinions may be products of bias (Kennedy & Pronin, 2008; Pronin, 2007), and people are most ready to believe that those who disagree with them are biased (Ross & Ward, 1996). This reflects an egocentric bias: people tend to believe that their own attitudes are correct, otherwise they would not hold them. If other individuals have different attitudes, we generally reason that they may be uninformed or biased by other motives. Despite recognition of bias in others, people are much less likely to recognize their own biases (Pronin, 2007).

There has been little research into source bias so far, but recent studies suggest it could undermine persuasion, although the relationship can be complex (Wallace et al., 2019b). People may be most likely to perceive that a source is biased when they disagree with the source (Ross

& Ward, 1996). In this case, someone who already disagrees with a position would see the source of a message in favor of that position as more biased. If I like Starbucks and someone presents an argument against the coffee chain, I may see that person as biased, just based on disagreement. We tend to have a view of the world based on naïve realism, where our perceptions of the world must be correct whereas the perceptions of others are biased if they disagree with our views (Ross & Ward, 1996). This perception of bias in others could lead to less persuasion. Moreover, if bias is recognized in a communicator delivering one persuasive message, the perception of bias could be carried over to ambiguously related messages from the same communicator (Wallace et al., 2019c). A carry-over of biased perceptions may result in similar effects on persuasion across the two messages: seeing bias in the first message reduces persuasion to both appeals. This new concept is plausible, as other persuasion variables such as argument quality have previously been shown to have carry-over effects to related messages (Petty, Haugtvedt, & Smith, 1995). If a communicator uses strong arguments which are persuasive in an initial message, a related subsequent message will become more persuasive just because of its link to the first message's strong arguments.

Given the potential effects of perceived source bias, it is important to better understand when people perceive a communicator as biased. Therefore, further defining when source bias occurs and its influence on persuasion was the focus of the present study. I hypothesized that statements of certainty would influence perceptions of bias, and that perception of bias may have downstream effects on attitudes.

Source Certainty

Beyond explicit markers of source credibility previously discussed, audiences are also sensitive to source characteristics conveyed through a communicator's certainty. People differ in

how certain they are in their attitudes, and these differences can be consequential. With little research currently in the area of source certainty, we can look at the plethora of information on attitude certainty for some insight. Perception of another person's certainty is different from recognizing certainty in our own attitudes, but research has shown we can detect another's certainty (e.g., Price & Stone, 2004; Pulford, Colman, Buabang, & Krockow, 2018) and that we may be more apt to see certainty and bias in others than in ourselves (Pronin, 2007).

Attitude certainty is made up of attitude clarity and attitude correctness (Petrocelli, Tormala, & Rucker, 2007). Clarity means how sure someone is about what their attitude on a topic is, whereas correctness means how sure a person is their attitude is the right one to have. It is possible what we see when we perceive other people's certainty is their belief of attitude correctness, because if they believe their attitude is already correct, they may be more likely to resist persuasion themselves, and thus seem biased. On the other hand, if we merely perceived that they had attitude clarity, we may see they know what their stance on a position is but that they are not confident in it, which does not seem like attitude certainty. Thus, I assume that when we perceive someone's attitude certainty, we are seeing their belief in attitude correctness, which is in turn linked to bias.

Some research has shown that attitude certainty predicts stability over time (Bassili, 1996; Luttrell, Petty, & Briñol, 2016) and resistance to persuasion (Clarkson, Tormala, & Rucker, 2008), particularly for univalent attitudes. Audiences may recognize this fact. A persuasive communicator's certainty could be used as an indication that the communicator would never be persuaded to change their mind. For a review of attitude certainty's effects on resistance to persuasion, see Tormala and Rucker (2007).

Past research has elaborated on the antecedents and consequences of people's own attitude certainty (Tormala & Rucker, 2018), but the present research is interested in the effects of another person's apparent certainty. A communicator's certainty can be conveyed in two closely related but nevertheless distinct ways.

First, communicators can convey their certainty through the language they use to argue their position. Confident (i.e., powerful) language is the way a communicator speaks or writes about their topic, and is usually conceptualized as lacking markers of powerless language, such as hedges and tag questions (e.g., Blankenship & Craig, 2007). Whereas powerless language is characterized by these markers (e.g., "sort of", "kind of", "don't you think?"), powerful language is generally represented by their absence in written communications. In spoken communications, confidence can be reflected in these linguistic markers as well as pitch, tone, and rate of speech (Guyer, Fabrigar, & Vaughan-Johnston, 2018). Indeed, when sources communicate their positions in a more confident style, audiences infer that they are more certain of their attitudes (Guyer et al., 2018). Moreover, audiences tend to be more persuaded by more confidently delivered messages (Blankenship & Craig, 2007; Blankenship & Holtgraves, 2005; Guyer et al., 2018).

Second, a communicator can convey their certainty more directly by voicing it explicitly. Generally, past research on source certainty has shown that explicit statements of confidence or certainty increase persuasion (e.g., Price & Stone, 2004; Pulford et al., 2018). It has been suggested that certainty could have differing effects depending on the expertise of a source using strong arguments, such that incongruence of expertise and source certainty produces more persuasion than when expertise and certainty are congruent (Karmarkar & Tormala, 2010). Thus, an expert source stating uncertainty produces more surprise and cognitive elaboration of strong

arguments, leading to more persuasion, than an expert source stating they are certain. The reverse is true for non-expert sources, which are more persuasive stating high certainty when using strong arguments than they are expressing uncertainty. Karmarkar and Tormala (2010) suggest this incongruity effect is due to violated expectations causing more elaboration of the message's strong arguments, and they also propose this may be due to a reduction in perceived bias. Unfortunately, perceived bias was not measured in this study.

In summary, the abundant research on attitude certainty can inform the minimal research into source certainty this far. Looking at research in attitude certainty, and knowing that people are quick to see bias in others (Pronin, 2007), I inferred that perceiving a communicator's certainty could lead to perceiving them as biased as well, and perceiving uncertainty may lead to a reduction in perceived bias. People truly process information in a biased way when they are relatively certain of their attitudes (Krosnick & Petty, 1995), and audiences may be right to perceive bias when someone says they are certain. The research in source certainty thus far suggests that the communicator's certainty may increase persuasion by implying that he or she is especially knowledgeable (Price & Stone, 2004), which applies to many contexts (e.g., expert witness testimony and jury decisions; Cramer, Brodsky, & DeCoster, 2009). Nevertheless, this effect may differ depending on elaboration of the message and argument quality (Petty & Cacioppo, 1986).

The Present Study

The present study sought to examine the effects of source certainty on perceived bias, and whether perceiving bias influences persuasion. More specifically, I expected that a source would seem more biased when she expressed certainty (vs. uncertainty) in her position. However, an

open question was whether certainty actively increases perceptions of bias and/or whether uncertainty decreases it. As a secondary interest, I also tested whether these perceptions of bias are in turn associated with differences in persuasion.

The present study used three conditions of source certainty to influence perceptions of bias: a statement of certainty, a statement of uncertainty, and a control with no statement about the source's certainty. The firm hypothesis was that certainty would lead to more perceived bias than uncertainty. This was supported in a pilot study, which also tested whether confident language and explicit source certainty independently influence perceptions of bias. Most relevant to the present study, however, is that a communicator seemed significantly more biased when he expressed high certainty in his attitude toward nuclear power ("I am very certain of my position on nuclear power, and nobody could change my mind on the topic.") than when he expressed uncertainty in his nuclear power attitude ("I am not very certain of my position on nuclear power, so my mind could be changed if I heard a good counter argument."), regardless of whether participants agreed or disagreed with his position. Nevertheless, by only comparing certainty versus uncertainty, that study was limited in the conclusions it could provide. By including a control condition, the present study made three competing hypotheses underlying the influence of source certainty on perceived bias.

First, expressing uncertainty could make the source seem less biased than expressing certainty or saying nothing. In other words, it may be that a declaration of uncertainty before a subjective message would decrease perceptions of bias. In contrast, a declaration of certainty would not differ from control in perceptions of bias. This could be because declarations of uncertainty are uncommon, leading readers to think there must be a reason for the uncertainty, such as a wide knowledge and understanding of both sides, indicating less bias. This prediction

is consistent with people usually *assuming* that others are certain, thus the certainty and control conditions would not differ based on that assumption. The uncertainty condition, however, is something different from the certainty usually assumed and thus would have a reduction in perceived bias.

Second, expressing uncertainty or saying nothing could both make the source seem less biased than expressing certainty. In other words, certainty is what increases perceived bias, whereas a declaration of uncertainty and the control condition would not differ. This could occur because people immediately perceive someone who says they are certain as biased, perhaps because it appears they are not open to other points of view due to their certainty. It could also mean that people generally assume others are *not* very certain, so expressing certainty is noteworthy and could indicate more bias, whereas expressing uncertainty and saying nothing are both assumed to have little bias.

Third, expressing uncertainty could result in less perceptions of bias than saying nothing, whereas expressing certainty could result in increased perceptions of bias. In other words, the bias perceived from a certain person and an uncertain person would both differ from the control condition in opposite directions. A declaration of uncertainty would decrease perceived bias in comparison to a control condition, whereas a declaration of certainty would increase perceived bias in comparison to the control. In this situation, any kind of statement regarding certainty influences perceived bias. It can decrease perceptions of bias if the statement is of uncertainty, perhaps acknowledging flaws or suggesting openness to other opinions, and it can increase perceptions of bias if the statement is of certainty, perhaps because certainty suggests close-mindedness.

In regard to persuasion, it is not clear whether bias will ultimately be consequential, as there has been little research on this effect so far. Nevertheless, if an audience thinks the source is biased (vs. unbiased), they may discount her arguments and thus experience less persuasion. However, it is also possible that audiences may be relatively open to a person's compelling arguments despite her apparent bias. Other variables may also be more important in relation to persuasion.

Finally, the study included questions to assess perceived credibility to explore its potential independent effects. While not central to the main questions of this study, source credibility is known to be associated with both source certainty and with persuasion in past research. Therefore, I also looked at whether source certainty would independently affect credibility, and if it would also have an effect on persuasion.

Method

Participants

Participants were randomly assigned to one of three conditions: certainty, uncertainty, or control. Based on standards in the field, I aimed for $n = 75$ participants per condition, and a total sample of $N = 225$. G*Power (Version 3.1.9.2) analyses suggested a sample size of 225 participants would provide 80% power with α at .05 to detect an overall effect size of $f = .208$ (a small to medium effect equivalent to $\eta_p^2 = .04$; Lenhard & Lenhard, 2019). In total, 227 participants (138 male, 87 female, 2 other; 157 White, 34 African American, 17 Hispanic/Latino, 16 Asian American, 8 Native American, 4 other; Mean age 34.66, $SD = 10.68$) were recruited using Amazon's Mechanical Turk (MTurk) online, and provided monetary compensation of \$1.00 for study completion.

Procedure

Participants recruited through MTurk read and acknowledged informed consent of the online survey. They were told that they would be reading a scenario about a political campaign for county commissioner, and to imagine it was happening in their county. The election for county commissioner was between Ben Patton and Jim Smith. Participants were informed they would read a message allegedly written by Cami, a local citizen, supporting Ben Patton and opposing Jim Smith.

The independent variable was a statement of Cami's certainty in her position, supporting Ben Patton and against Jim Smith. Participants were randomly assigned to read one of three statements before Cami's message was presented: a statement of Cami's certainty in her position before the message, a statement of Cami's uncertainty in her position before the message, or a control condition with no such statement. Everyone then read the same message in which Cami presents arguments in favor of Ben Patton and against Jim Smith. After the message, participants completed the dependent measures and demographics.¹ Finally, they were thanked and given a code to receive their monetary compensation.

Materials

Certainty manipulation. The participants read a brief introduction to the message topic and saw a screen informing them that they would now read a message from Cami. Along with this information, a quote from Cami was used to manipulate source certainty. The quote either stated Cami's certainty ("I am completely certain that Jim Smith should not be county commissioner.") or her uncertainty ("I am not completely certain, but I do not think Jim Smith

¹ Exploratory variables (Appendix C) including attitudinal source perceptions, need for cognition, and others were also measured; however, no substantive analyses were conducted on these.

should be county commissioner.”). The control condition had no statement of certainty from Cami. Participants then proceeded to the persuasive message (see Appendix A for certainty manipulation and persuasive message).

Persuasive political message. Materials included a short persuasive message about a political campaign for county commissioner. This topic was chosen for its subjectivity, ambiguity in argument quality, and relatively confident (i.e., not powerless) language, and it has been used effectively in past research (Wallace et al., 2019b). These characteristics were considered desirable to maximize the chances of observing effects on persuasion.

First, perceived source bias was expected to be a more important cue when the topic (e.g., supporting a political candidate) is perceived as highly subjective, compared to topics that seem to have objectively correct answers (e.g., predicting future stock performance) where bias may be less important, and certainty may be relied on more like a confidence heuristic for knowledge (e.g., Price & Stone, 2004). More knowledge should be trusted in an objective outcome, regardless of bias, whereas in a subjective outcome as in the current study, perceived source bias was expected to be more influential.

Second, an ambiguously strong message (i.e., having a mix of strong and weak arguments) was necessary in order to allow participants to selectively pay attention to strong (weak) arguments if they believed the source to be unbiased (biased) based on previously seeing the source as uncertain (certain). In other words, an ambiguous message would maximize the potential for perceived source bias to result in differences in persuasion.

Finally, this message did not contain markers of powerless language, therefore making the language relatively confident. This held the variable of confident language constant so that it would not change perceptions of source certainty. The message has also been used effectively in

other research in persuasion (Wallace et al., 2019b), which will be useful in comparing findings between studies and spurring future research.

Dependent measures

Source perceptions. Participants evaluated Cami on a number of dimensions, including bias, certainty, expertise, trustworthiness, and credibility (Appendix B). There were three items on source bias which were combined to form one bias score with high reliability (Cronbach's $\alpha = .88$), three items on perceived source certainty (Cronbach's $\alpha = .92$), two items for expertise (Cronbach's $\alpha = .81$), two for trustworthiness (Cronbach's $\alpha = .77$), and two for credibility (Cronbach's $\alpha = .90$).

Persuasion. This study included two approaches to assessing persuasion. First, participants reported their attitudes toward Jim Smith, with three items previously used in a similar study by Wallace and colleagues (2019b). These items are listed in Appendix B, and were averaged to create a single attitude score (Cronbach's $\alpha = .93$). Second, I measured perceived argument quality using two items which were averaged to form a single score of how strong participants believed Cami's arguments were (Cronbach's $\alpha = .95$).

Attention Checks

There were two multiple-choice attention check items (Appendix D). One item asked which candidate Cami *supported* in the election (Ben Patton), and the other item asked which candidate Cami *opposed* (Jim Smith). Participants who incorrectly answered one of these items were excluded from analyses.

Results

There were 29 participants (13% of the sample) who failed to correctly identify who the persuasive message was about (11 in the certainty condition, 7 in the uncertainty condition, and 11 in the control condition). These participants were dropped from the analysis, resulting in a

final sample size of 198 (121 male, 75 female, 2 other; 134 White, 32 African American, 16 Asian American, 16 Hispanic/Latino, 5 Native American, 4 other; $M_{\text{age}} = 34.91$, $SD = 10.42$). G*Power sensitivity analyses indicated I achieved 80% power to find effect sizes as small as $f = .222$ ($\eta^2 = .05$) with α at .05.

Manipulation Check

Results of a one-way ANOVA showed that the manipulation effectively influenced participants' perceptions of source certainty, $F(2, 195) = 22.53$, $p < .001$, $\eta_p^2 = .19$. According to Scheffé post-hoc tests, participants in the high certainty ($M = 4.39$, $SD = .78$) and control ($M = 4.14$, $SD = .85$) conditions believed Cami was more certain in her position than participants in the uncertainty condition ($M = 3.33$, $SD = 1.17$; $ps < .001$). Thus, the certainty manipulation worked to influence participants' views of Cami's certainty; however, perceptions of certainty in the control condition did not significantly differ from the high certainty condition ($p = .34$). Overall, participants viewed the high certainty and control conditions on the high end of the certainty scale (4.39 and 4.14 out of 5.00), whereas perceived source certainty in the uncertainty condition was just above the scale midpoint (3.33 out of 5.00). Table 1 overviews these and subsequent ANOVA results.

Source Bias

A one-way ANOVA on bias by certainty condition was, unexpectedly, not significant, $F(2, 195) = 2.47$, $p = .09$, $\eta_p^2 = .03$. Nonetheless, because bias was my main variable of interest, I performed a planned contrast between the certainty and uncertainty condition on bias. Contrary to my hypothesis, the results of this planned contrast showed that participants in the certainty condition ($M = 3.61$, $SD = 1.03$) saw Cami as slightly less biased than participants in the uncertainty condition ($M = 3.96$, $SD = .85$), $F(1, 130) = 4.62$, $p = .03$.

Source Credibility

I measured three aspects of source credibility: perceived expertise, trustworthiness, and overall credibility, measured by two items each. Because of the high inter-correlation between these three variables (see Table 2), and since our pilot study and other previous research in the field has considered more general indices of credibility across a variety of specific perceptions, they were averaged together into a total credibility composite score with satisfactory reliability (Cronbach's $\alpha = .74$). This was submitted to a one-way ANOVA by condition and was significant, $F(2, 195) = 5.30, p = .006, \eta_p^2 = .05$. Scheffé post-hoc tests showed that participants in the high certainty condition ($M = 2.84, SD = .82$) judged Cami to be more credible overall than participants in the uncertainty condition ($M = 2.39, SD = .75; p = .006$). The control condition ($M = 2.63, SD = .77$) did not significantly differ from the high certainty or the uncertainty conditions, $ps > .10$. Consistent with past research, if the source in this study expressed high certainty, she was rated as more credible overall than if the source expressed uncertainty. A one-way ANOVA was also done on each of the three sub-components of the credibility composite, each yielding similar results, which are reported in Table 1.

Persuasion

Effect of condition on attitudes. The first of two dependent variables measuring persuasion was attitudes toward Jim Smith, the candidate for county commissioner whom Cami opposed in the persuasive message. Results of a one-way ANOVA did not support an effect of certainty condition on attitudes toward Jim Smith, $F(2, 195) = .11, p = .90, \eta_p^2 = .001$. A planned contrast was performed which similarly found no evidence for differences between high certainty and uncertainty conditions, $F(1, 130) = .12, p = .731, \eta_p^2 = .001$.

Table 1

Analyses of Variance on Dependent Variables by Certainty Condition

	Means			ANOVA		Planned Contrasts	
	Uncertainty	Control	Certainty	<i>F</i>	<i>p</i>	η_p^2	<i>p</i>
Certainty	3.33	4.14	4.39	22.53	<.001	.19	<.001
Bias	3.96	3.71	3.61	2.48	.09	.03	.03
Credibility Composite	2.39	2.63	2.84	5.30	.006	.05	.006
Expertise	2.12	2.39	2.50	2.76	.07	.03	.03
Trustworthiness	3.02	3.19	3.51	4.36	.01	.04	.02
Credibility	2.05	2.30	2.50	3.48	.03	.03	.03
Attitude to Jim Smith	2.39	2.32	2.33	.11	.90	<.01	.73
Argument Quality	2.33	2.66	2.83	2.89	.06	.03	.02

Note: Planned contrasts were between the uncertainty and the high certainty conditions.

Table 2

Descriptive Statistics and Pearson Correlations of Dependent Variables

	Mean	SD	1	2	3	4	5	6	7
1. Certainty	3.96	1.04	--						
2. Bias	3.76	.95	.028 _(ns)	--					
3. Expertise	2.34	.96	.224	-.349	--				
4. Trustworthiness	3.24	.99	.374	-.172	.307	--			
5. Credibility	2.28	1.01	.163	-.461	.779	.364	--		
6. Credibility Composite	2.62	.80	.313	-.405	.856	.690	.884	--	
7. Attitude to Jim Smith	2.35	.88	-.098 _(ns)	.347	-.031 _(ns)	-.209	-.171	-.171	--
8. Argument Quality	2.61	1.22	.131 _(ns)	-.458	.627	.316	.680	.668	-.311

Note: ns = not significant; All other correlations significant $p < .05$

Effect of condition on perceived argument quality. The second dependent variable measuring persuasion was perceived argument quality, since people are often more persuaded by higher quality arguments. This was submitted to a one-way ANOVA by condition, and the result was marginally significant, $F(2, 195) = 2.89, p = .06, \eta_p^2 = .03$. A planned contrast showed that participants judged the message's arguments to be stronger in the high certainty condition ($M = 2.83, SD = 1.33$) than in the uncertainty condition ($M = 2.33, SD = 1.15$), $F(1, 130) = 5.35, p = .02, \eta_p^2 = .04$. However, it should be noted that in both conditions, argument quality was rated below the scale midpoint of 3.00 out of 5.00, indicating that the arguments were not viewed as particularly strong overall.

Indirect effects

Given the evidence thus far that low (vs. high) source certainty leads to greater perceptions of bias, whereas high source certainty leads to greater perceptions of source credibility and greater perceptions of argument quality, it was important to test (a) whether the effects on bias and credibility were statistically independent and (b) whether the effects on bias and/or credibility statistically mediated the effect on perceived argument quality.

To test whether the effects on bias and credibility were statistically independent, I conducted two analyses of covariance (ANCOVAs). First, an ANCOVA was run on bias by condition, with the credibility composite score as a covariate. The result of the one-way ANCOVA was non-significant, $F(2, 194) = .60, p = .55, \eta_p^2 = .006$, and the planned contrast was also non-significant, $F(1, 129) = 1.02, p = .314, \eta_p^2 = .008$, indicating that the effect of source certainty on bias was no longer reliable after controlling for perceived source credibility. Next, an ANCOVA was run on the credibility composite by condition, this time using bias as the covariate. This was significant, $F(2, 194) = .336, p = .04, \eta_p^2 = .03$, as was the planned contrast

between uncertainty and certainty conditions, $F(1, 129) = 6.64, p = .01, \eta_p^2 = .05$. Thus, contrary to my hypothesis, source certainty did not significantly and uniquely influence perceptions of bias, yet source certainty did uniquely affect perceptions of credibility, as shown in previous research.

Having established that source certainty affects perceived source credibility even when controlling for perceived bias, I next tested the unique role of credibility as a mediator (controlling for perceived bias) of the effect of certainty condition on perceived argument quality. Data were submitted to tests of mediation using Model 4 in the PROCESS add-on for SPSS (Hayes, 2018).

Specifically, I tested the effect of the certainty manipulation on perceived argument quality through its effects on perceived source credibility, controlling for perceived source bias. To simplify the model and emphasize the comparison of interest, I looked only at the certainty versus uncertainty conditions. Mirroring results reported earlier, the regression models showed that the certainty manipulation affected the credibility composite score, $B = .17, t(129) = 2.58, p = .01$, and credibility was a significant predictor of perceived argument quality; the more credible the communicator seemed, the stronger her arguments appeared to be, $B = .94, t(128) = 8.64, p < .001$. The source certainty manipulation no longer affected perceived argument quality after controlling for perceived credibility and bias, $B = -.0003, t(128) = -.004, p = .99$.

Most importantly, however, the indirect effect of certainty condition on perceived argument quality through perceived source credibility (controlling for perceived source bias),

tested with a bootstrapping method of 5,000 iterations, was statistically significant, $B = .16$, $SE = .07$, 95% CI: [.03, .30] (Figure 1).²

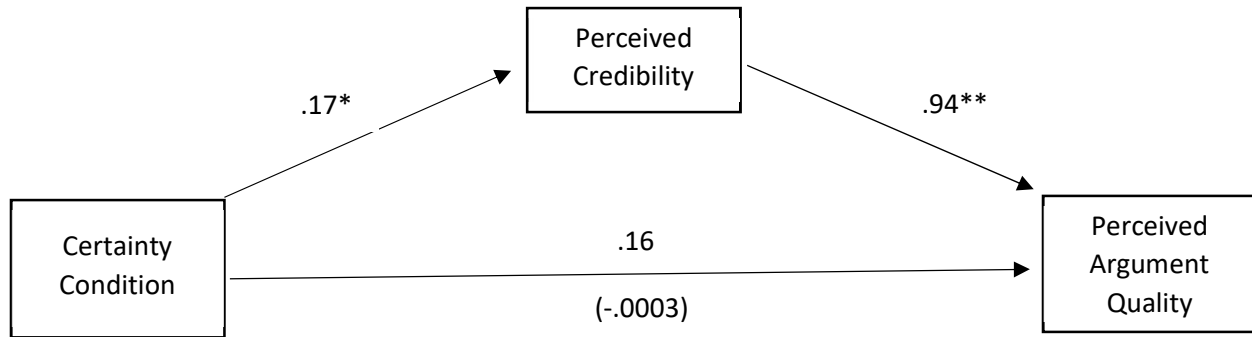


Figure 1. Mediation of certainty condition effects on argument quality through credibility with bias as a covariate. Asterisks denote coefficient significance at: * $p < .05$, ** $p < .001$; All other results not significant.

Discussion

In summary, the manipulation successfully influenced participant perceptions of source certainty. The omnibus ANOVA test on perceived bias was non-significant, yet planned contrasts showed that high source certainty actually led to lower perceptions of bias. However, this effect did not hold up when controlling for perceptions of source credibility. When participants viewed the source as certain, they also viewed her as more credible, which held even when controlling for perceived bias, indicating the importance of perceived credibility in this study.

² A mediation model using perceived argument quality as the mediator between source certainty and perceived source credibility was also conducted, with perceived bias as a covariate, but the indirect effect of this model was not significant, $B = .06$, $SE = .04$, 95% CI: [-.01, .16]

Source certainty's effects on persuasion were mixed. There was no effect of certainty condition on participants' attitude change: attitudes toward the target, Jim Smith, were not significantly affected by the source's expressed certainty. There was an effect on perceived argument quality, though: the persuasive arguments were generally judged to be stronger when participants viewed the source as more confident. This was mediated by a unique effect of source certainty on perceived credibility.

None of my three competing hypotheses for perceived bias were supported. These all assumed that perceiving a source as certain would increase perceptions of bias over a source that was perceived as uncertain, with varied hypotheses on where the control condition would fall. If anything, I got the contradictory result that the low certainty source seemed more biased than the high certainty source; however, after controlling for perceived credibility, this effect disappeared. Credibility seemed like the more important variable in this situation in that it was directly associated with source certainty.

The results on perceived bias in this study are inconsistent with previous studies, including our pilot study, which have shown that people perceive more bias for communicators who express high (vs. low) certainty. There are three possible reasons for this result. One possibility is that the subjectivity of the message in this study may have reduced the importance of bias, rather than increasing it as I had assumed. The decision of who would make a better candidate for county commissioner is largely a subjective one, and Cami's message was her opinions on why Ben Patton would be a good candidate whereas Jim Smith would be a bad one. Because of this subjectivity, the importance of bias may have been reduced since subjective messages may inherently be viewed as biased. This would likely increase the importance of credibility: if bias is common in subjective messages, then it would not make a good standard for

judging the merits of a message, so some other variable such as credibility must be used.

Therefore, source credibility may have been more important than source bias in this study.

A second possibility is that source credibility was not necessarily more important, but people might be more likely to focus on credibility than bias. In this context of support and opposition for fictional candidates for county commissioner, perhaps participants could more easily judge the source's credibility than her bias. A more certain campaigner may seem more credible if they are giving their opinion on who to support. They may be certain because they have done their research. On the other hand, an uncertain campaigner may not have done their research, thus reducing their credibility. Yet, because there was little context given related to Cami, the candidates, or the election for county commissioner, it may have been more difficult for participants to determine Cami's bias, leading to more reliance on the salient source credibility due to source certainty.

A third and final possibility for my null effect on perceived bias is that perceived bias was artificially high in all conditions. Participants in all conditions viewed the source to be relatively biased, above the scale midpoint. This could be due to the subjectivity of the message and the fact that it largely attacked the opposing candidate, which participants may have viewed negatively. The shared feature across conditions of a political attack ad may have influenced all participants to perceive a high general level of bias. Whether or not the source stated that she was certain or uncertain of her position, an attack ad may have been seen as biased anyway.

The effects of perceived source certainty and bias on persuasion were also of interest in this study. I looked at two measures of persuasion: perceived quality of the arguments in the message, and attitudes toward Jim Smith, the candidate Cami opposed. There were no persuasion

effects for attitudes whereas the certainty manipulation did affect perceived argument quality, but why were there such divergent results in the two persuasion measures?

There are at least three reasons why I observed effects on perceived argument quality but not on attitudes toward Jim Smith. First, it is possible that perceiving the source as more credible because of her certainty made everything about the message seem slightly more credible, including the arguments, yet the arguments were still not strong enough to influence attitudes. Similarly, participants may have other motivations that made them unlikely to change their attitudes, even if they realized the arguments were stronger. Based on the information they were given and their own opinions, they may have come up with their own reasons to support a candidate that seemed separate from the strength of Cami's arguments.

Second, the subjectivity of the political topic and the ambiguity surrounding Cami and the candidates could have rendered the attitudes measures unclear. That is, participants had no more information about Cami and the candidates than what was provided in the materials, which was very little. It may have been difficult to formulate an accurate impression of Jim Smith based on this limited information and the fact they had no previous knowledge of Cami and the candidates or their prior behaviors. Also of note, 29 participants were excluded from analyses because they could not identify Ben Patton as the candidate Cami supported, or could not identify Jim Smith as the candidate she opposed. This may be more than mere inattention: the discussion of two fictional candidates side by side in the same message may have confused some participants, beyond those which were excluded from analyses. Participant confusion could have added measurement error to my key dependent variables, in this case attitudes.

Finally, because the participants knew that the materials were all hypothetical, they may have been relatively unmotivated to form a clear attitude toward the candidates, introducing

considerable random noise on this variable despite a capability to more clearly evaluate the message's arguments.

Limitations and Future Directions

First, 29 of 227 participants had to be dropped from the analyses because they failed the attention check. This brought the total sample size to 198, below the desired 225 to achieve a power of .80 for an effect size of $f = .208$. This may have had some effect on the results, perhaps obscuring any effects on perceived bias. I should have accounted for some failures of attention and recruited more participants. Nevertheless, my final sample size still provided 80% power to detect effects as small as $f = .222$ ($\eta^2 = .05$).

Second, there may have been issues with the specific message used in this study. It was hypothetical; participants may not have been very invested in reading about fictional candidates for county commissioner. Low personal investment may have led to indifference in some responses, particularly in regard to attitudes toward Jim Smith. Moreover, the message was both pro-Patton and anti-Smith, which may have added noise to the persuasion dynamics of interest. The mix of pro-Patton and anti-Smith arguments may have confused some participants and added error into the statistical models. I also did not ask participants for their attitudes toward Ben Patton, so it cannot be determined whether Cami's message may have been persuasive by increasing support for Patton, even though we know that it did not reduce support for Smith. This may be another reason I did not get the attitudes effect. People might be unwilling to dislike someone on the basis of an attack ad, but they might have been more swayed by the positive things Cami said about Patton. This cannot be determined from the current results.

Third, this was a brief online study conducted in survey format. This very specific, hypothetical format may not translate to how the dynamics of certainty, bias, and persuasion

would work in the field. A source's certainty may have differing effects on perceived bias, credibility, and persuasion in a real-world setting, where citizens likely have more sources of information, and previously developed opinions about the bias of political campaigners and candidates in their local counties, for instance. These variables are likely influential in real-world circumstances, but this study did not look at their influence in the field.

Future research should address these limitations, in particular by looking to better control perceived credibility in order to isolate the effects of source certainty on perceived bias. The effects of source certainty on perceived bias still need to be disentangled from source certainty's effects on perceived credibility. To continue down this path, future research should search for moderators of certainty's effect on perceived bias. Sometimes source certainty affects perceptions of bias, but sometimes it does not, as has been shown here; it is important to find out what causes this shift. We should look for conditions under which certainty has each of these effects, experimentally manipulating variables like the type of message, argument strength, and whether the persuasive messages involve hypothetical or real scenarios in order to test interactions with source certainty. We know that sometimes source certainty leads to perceived bias and other times it does not, but the question is why and when.

In conclusion, this study failed to show a robust effect of source certainty on perceived bias, while supporting the findings of previous research on source certainty's effects on perceived credibility. It remains to be shown why perceived bias increases in relation to high source certainty in some contexts, but not in others. Another important contribution of this line of research was to show that people believe that a persuasive message contains stronger arguments when the communicator expresses certainty (versus uncertainty) in their position. This finding is important in numerous applied contexts. For instance, politicians who express certainty

may appear to make a stronger case for their policies, and sales marketers might appear to make stronger pitches for their product if they say they are sure it is high quality. Future research should look into when source certainty leads to perceptions of stronger arguments, and how those influence attitudes, persuasion, and behavior.

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Appendix A

Political Campaign Message Materials

Instructions:

In this study, we will tell you about a political campaign. We would like for you to treat it as though it is real and happening in your local county.

In this campaign, Cami, a local citizen, is campaigning for Ben Patton and against Jim Smith. Patton and Smith are running against each other in the race for county commissioner.

In a few screens, you will see a message from Cami opposing Jim Smith's candidacy.

Certainty Manipulation:

Certainty Condition

On the next screen is a message from Cami opposing Jim Smith's candidacy for county commissioner. In regard to the candidates for county commissioner, Cami has said, **"I am completely certain that Jim Smith should not be county commissioner."** As you read, consider the impression you form of Cami. Please read carefully and answer the questions that follow.

Uncertainty Condition

On the next screen is a message from Cami opposing Jim Smith's candidacy for county commissioner. In regard to the candidates for county commissioner, Cami has said, **"I am not completely certain, but I do not think Jim Smith should be county commissioner."** As you read, consider the impression you form of Cami. Please read carefully and answer the questions that follow.

Control Condition

On the next screen is a message from Cami opposing Jim Smith's candidacy for county commissioner. As you read, consider the impression you form of Cami. Please read carefully and answer the questions that follow.

Message:

Jim Smith is wrong for our county!

Jim Smith is uneducated. Smith earned his college degree in music education, which has nothing to do with managing a government. Patton has a four year degree in Communications.

Jim Smith is secretive. After serving on the park board for two years, Smith left the position for reasons that he never disclosed. Patton has always been open about his absences from public office.

Jim Smith is inexperienced. He has served on the park board and the school board, but has no experience in criminal justice. Patton's time as a volunteer firefighter has provided him with connections to law enforcement and given him experience in emergency situations.

Jim Smith is uneducated, secretive, and inexperienced. He is wrong for our county. Join me in the fight against Jim Smith!

Questionnaire instructions:

Please answer the following questions about Cami's message.

Appendix B

Dependent Variables

Bias

- To what extent do you feel that Cami's opinion is a product of personal bias?
 - (1 = Not At All; 5 = Extremely)
- How much do you think that Cami has a biased perception about Jim Smith?
 - (1 = Not At All; 5 = Extremely)
- Do you feel that Cami has a biased opinion about Jim Smith?
 - (1 = Not At All; 5 = Extremely)

Certainty

- How certain was Cami that her position is correct?
 - (1 = Not At All; 5 = Extremely)
- How sure was Cami of her opinion?
 - (1 = Not At All; 5 = Extremely)
- How confident was Cami in her position?
 - (1 = Not At All; 5 = Extremely)

Expertise

- How qualified do you think that Cami is to speak about Jim Smith as a candidate for county commissioner?
 - (1 = Not At All; 5 = Extremely)
- To what extent does it seem like Cami is an expert on Jim Smith as a candidate for county commissioner?
 - (1 = Not At All; 5 = Extremely)

Trustworthiness

- When Cami shares her opinion on Jim Smith with others, to what extent do you perceive that she tries to communicate the truth as she sees it?
 - (1 = Not At All; 5 = Extremely)
- When Cami shares her opinion on Jim Smith with others, to what extent do you think she shares her honest opinion?
 - (1 = Not At All; 5 = Extremely)

Credibility

- How credible do you think Cami is?
 - (1 = Not At All; 5 = Extremely)
- How much do you see Cami as a credible source about Jim Smith?
 - (1 = Not At All; 5 = Extremely)

Attitude toward Jim Smith

- How much do you support Jim Smith as a candidate for your local county commissioner?
 - (1 = Not At All; 5 = Extremely)
- How much would it be a good idea for Jim Smith to be elected as your local county commissioner?
 - (1 = Not At All; 5 = Extremely)
- How much is Jim Smith a good candidate for your local county commissioner?
 - (1 = Not At All; 5 = Extremely)

Argument Quality

- How strong were Cami's arguments?
 - (1 = Not At All; 5 = Extremely)
- How strong was Cami's persuasive message?
 - (1 = Not At All; 5 = Extremely)

Appendix C

Exploratory Variables

Trust on another topic

- How much would you trust Cami's perspective on the candidates for another local office, such as school board?
 - (1 = Not At All; 5 = Extremely)

Bias on another topic

- How much do you think that Cami would have a biased perspective on the candidates for another local office, such as school board?
 - (1 = Not At All; 5 = Extremely)

Cooperativeness

- How cooperative does Cami seem?
 - (1 = Not At All Cooperative; 5 = Extremely Cooperative)

Source Openness

- How much do you think Cami is open to arguments of people supporting Jim Smith?
 - (1 = Not At All Open; 5 = Extremely Open)

Source Thoughtfulness

- How much do you think Cami has thought about the candidates for county commissioner?
 - (1 = Not At All Thought Out; 5 = Extremely Thought Out)

Leaving information out

- Do you think Cami left any information out?
 - (1 = Not At All; 5 = Definitely)

Self-reported elaboration

- How much did you think about Cami's message?
 - (1 = Not At All; 5 = Extremely)

Need for Cognition 6-item scale (Coelho, Hanel, & Wolf, 2018)

(1 = Extremely Uncharacteristic of Me; 5 Extremely Characteristic of Me)

- Please read the following statements and indicate how characteristic they are of you.
 - I would prefer complex to simple problems.
 - I like to have the responsibility of handling a situation that requires a lot of thinking.
 - Thinking is not my idea of fun.
 - I would rather do something that requires little thought than something that is sure to challenge my thinking abilities.
 - I really enjoy a task that involves coming up with new solutions to problems.
 - I would prefer a task that is intellectual, difficult, and important to one that is somewhat important but does not require much thought.

Appendix D

Attention Check

Attention Check

- Who did Cami **support** in the campaign for county commissioner?
 - Jim Smith
 - Ben Patton
 - Cami
- Who did Cami **oppose** in the campaign for county commissioner?
 - Jim Smith
 - Ben Patton
 - Cami